Lesson 3 Graphing Quadratic Inequalities 2 Variables

Steps:

1. Graph the quadratic equation
   - Determine whether the curve should be broken(dashed) or solid

   $<$ or $>$ (broken) $\leq$ or $\geq$ (solid)

2. Determine where to shade
   - Choose a test point

Example 1: Sketch each of the following:

a.) $y < 3x^2 - 4$ (broken)

$y = 3x^2 - 4$

vertical stretch by 3 (mult y-coords by 3)

$k = -4$ down 4 units

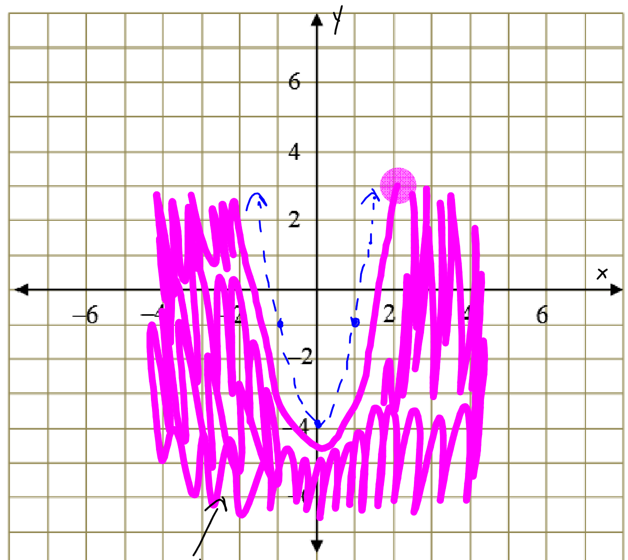
Test point $(0,0)$

$y < 3x^2 - 4$

$0 < 3(0)^2 - 4$?

$0 < -4$ False

$\therefore$ shade outside



sol'n shaded region

b.) $y \geq x^2 - 2x - 8$

$y = x^2 - 2x - 8$ $\left(\frac{-2}{2}\right)^2$

$y = (x^2 - 2x + 1) - 8 - 1$

$y = (x-1)^2 - 9$

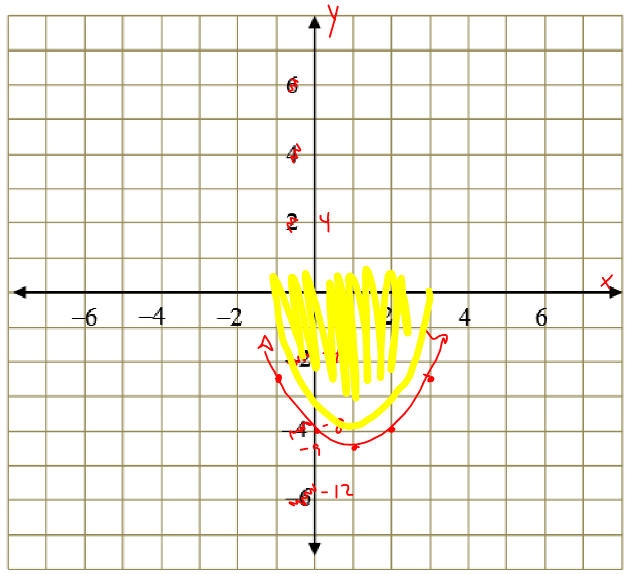
right 1, down 9, balance the eqn

Test (0, 0)

$y \geq 0^2 - 2(0) - 8$?

$0 \geq -8$ True

∴ shade inside



c.) $y < 2x^2 - 8x + 1$

$y = (2x^2 - 8x) + 1$

$y = 2(x^2 - 4x + 4) + 1 - 8$

$y = 2(x-2)^2 - 7$

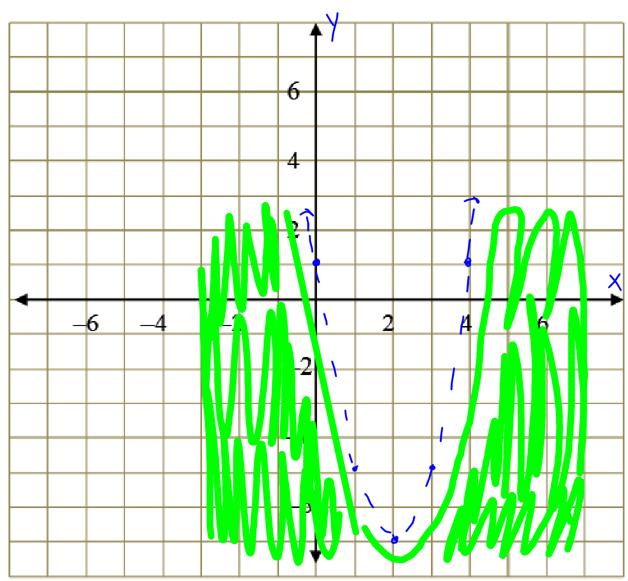
mult y-coords by 2, right 2, down 7

Test pt (1, 1)

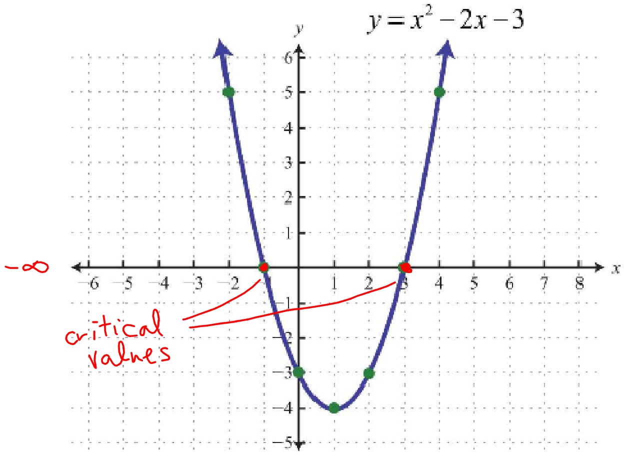
$y < 2x^2 - 8x + 1$

$1 < 2(1)^2 - 8(1) + 1$?

$1 < -5$



Example 2
Use the given graph to write the solution of the corresponding quadratic inequality $x^2 - 2x - 3 \geq 0$. ← one variable → sol'n will be an interval(s) not a shaded region



$x^2 - 2x - 3 \geq 0$ ← positive y-values

sol'n
$(-\infty, -1] \cup [3, \infty)$

<u>Bulawka's Bullets</u>

- Watch the difference between $y \leq ax^2 + bx + c$ (shading) and $ax^2 + bx + c \leq 0$ (intervals)
- Make sure you use a broken curve for $<$ or $>$

Assignment: Pg. 374 #4a, d, 5, 6a, d, 7a, c, 10a, 11 Pg. 346 #4a, b